AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in this application.

Listing of Claims:

Claims 1-34 (Cancelled)

35. (Previously Presented) A process for forming an antifuse comprising:

exposing an oxidizable surface to an plasma oxidation process for an initial exposure time; and

growing an oxide film on the oxidizable surface, and

wherein the oxide film grows to a predetermined thickness at an end of the initial exposure time, and wherein additional exposure to the plasma oxidation process beyond the initial exposure time does not result in a significant further increase in thickness of the oxide film.

36. (Original) The process of claim 35, wherein the plasma oxidation process comprises providing a substrate having a back surface opposite a face surface, wherein the oxidizable surface comprises at least a portion of the face surface, and contacting the back surface with a cooling medium.

37. (Original) The process of claim 35, wherein the plasma oxidation process comprises applying an RF bias voltage to the oxidizable surface.

38. (Original) The process of claim 35, wherein the plasma oxidation process comprises generating a plasma comprising oxygen and an inert gas.

39. (Original) The process of claim 35, further comprising subjecting the oxidizable surface to a plasma containing a nitrogen species prior to exposing the oxidizable surface to a plasma oxidation process.

40. (Original) The process of claim 39, wherein subjecting the oxidizable surface to a plasma containing a nitrogen species comprises subjecting the oxidizable surface to a plasma formed by a gas selected from the group consisting of nitrogen, nitrous oxide and ammonia.

Claims 41-71 (Cancelled)

72. (Previously Presented) A plasma oxidation process comprising:

exposing an oxidizable surface to an oxidizing plasma,

wherein the oxidizing plasma has an activity relative to the oxidizable surface;

forming an oxide film on the oxidizable surface; and

regulating the oxidizing plasma activity to limit a rate of formation of the oxide film by regulating at least one of the following: reaction kinetics, growth initiation, and surface energy.

73. (Previously Presented) The plasma oxidation process of claim 72, wherein regulating the oxidizing plasma activity comprises bombarding the oxidizable surface with energized ions prior to exposing the oxidizable surface to the oxidizing plasma.

74. (Previously Presented) The plasma oxidation process of claim 73, wherein bombarding the oxidizable surface comprises bombarding the oxidizable surface to remove contaminants from the oxidizable surface.

75. (Previously Presented) The plasma oxidation process of claim 73, wherein bombarding the oxidizable surface comprises bombarding the oxidizable surface to remove other oxide layers present on the oxidizable surface.

76. (Previously Presented) The plasma oxidation process of claim 73, wherein bombarding the oxidizable surface comprises bombarding the oxidizable surface to facet the oxidizable surface.

77. (Previously Presented) The plasma oxidation process of claim 73, wherein bombarding the oxidizable surface with energized ions comprises subjecting the oxidizable surface to a bias voltage.

78. (Previously Presented) The plasma oxidation process of claim 72, wherein regulating the oxidizing plasma activity comprises diluting the oxidizing plasma with an inert gas.

79. (Previously Presented) The plasma oxidation process of claim 72 further comprising providing a substrate having a back surface opposite a face surface, wherein the oxidizable surface comprises at least a portion of the face surface, and wherein regulating the oxidizing plasma activity comprises contacting the back surface with a cooling medium.

80. (Previously Presented) The plasma oxidation process of claim 72, wherein regulating the oxidizing plasma activity comprises applying an RF bias voltage to the oxidizable surface.

81. (Previously Presented) The plasma oxidation process of claim 72 further comprising:

providing a plasma chamber;

placing a substrate in the plasma chamber; and

igniting the oxidizing plasma after placing the substrate in the plasma chamber.

82. (Previously Presented) The plasma oxidation process of claim 72 further comprising igniting an inert gas plasma prior to igniting the oxidizing plasma.

83. (Previously Presented) The plasma oxidation process of claim 82 further comprising placing the oxidizable surface in the inert gas plasma.

84. (Previously Presented) The plasma oxidation process of claim 72 further comprising providing a plasma power source having an output power, and wherein regulating the oxidizing plasma comprises limiting the output power to a predetermined level.

85. (Previously Presented) The plasma oxidation process of claim 72, wherein the oxidizable surface comprises silicon.

86. (Previously Presented) The plasma oxidation process of claim 72, wherein the oxidizable surface comprises a semiconductor element of an antifuse device.

87. (Previously Presented) The plasma oxidation process of claim 72, wherein exposing an oxidizable surface to an oxidizing plasma comprises exposing the oxidizable surface to a plasma comprising oxygen.

88. (Previously Presented) The plasma oxidation process of claim 72, wherein regulating the oxidizing plasma activity comprises applying a bias voltage and sputtering a portion of the oxide film while simultaneously forming the oxide film.

89. (Previously Presented) A process for fabricating an oxide film in a semiconductor device comprising the steps of:

forming a semiconductor layer;

exposing the semiconductor layer to a plasma comprising oxygen,

wherein the plasma has an activity relative to the semiconductor layer;

forming an oxide film on the semiconductor layer; and

regulating the plasma activity to limit a rate of formation of the oxide film by regulating at least one of the following: reaction kinetics, growth initiation, and surface energy.

90. (Previously Presented) The process of claim 89, wherein the step of forming a semiconductor layer comprises forming a doped semiconductor layer.

91. (Previously Presented) The process of claim 89, wherein the step of forming a semiconductor layer comprises forming a silicon layer.

92. (Previously Presented) The process of claim 89, wherein the step of forming a semiconductor layer comprises forming a germanium layer.

93. (Previously Presented) The process of claim 89 further comprising forming an electrically conductive layer prior to forming the semiconductor layer.

94. (Previously Presented) The process of claim 89, wherein the oxide film comprises a gate oxide layer.

95. (Previously Presented) The process of claim 89, wherein the oxide film comprises a passivation layer.

96. (Previously Presented) A process for fabricating a dielectric film in a semiconductor device comprising the steps of:

exposing an oxidizable surface to a plasma comprising an oxygen species and a nitrogen species,

wherein the plasma has an activity relative to the oxidizable surface;

forming an oxynitride film on the oxidizable surface; and

regulating the plasma activity to limit a rate of formation of the oxynitride film by regulating at least one of the following: reaction kinetics, growth initiation, and surface energy.

97. (Previously Presented) The process of claim 96, wherein the nitrogen species comprises a compound selected from the group consisting of nitrogen, ammonia and nitrous oxide.

98. (Previously Presented) The process of claim 96, wherein the step of forming an oxynitride film comprises a gate oxide layer.

99. (Previously Presented) The process of claim 96, wherein the step of forming an oxynitride film comprises a passivation layer.

100. (Previously Presented) The process of claim 96, wherein the step of forming an oxynitride film comprises an antifuse layer.

101. (Previously Presented) The process of claim 96, further comprising subjecting the oxidizable surface to a plasma containing a nitrogen species prior to exposing the oxidizable surface to a plasma comprising an oxygen species and a nitrogen species.

102. (Previously Presented) The process of claim 101, wherein subjecting the oxidizable surface to a plasma containing a nitrogen species comprises subjecting the oxidizable surface to a plasma formed by a gas selected from the group consisting of nitrogen, nitrous oxide and ammonia.

103. (Previously Presented) A process for fabricating an oxide film in a semiconductor device comprising the steps of:

exposing an oxidizable surface to a plasma comprising oxygen,

wherein the plasma has an activity relative to the oxidizable surface;

forming an oxide film on the oxidizable surface;

regulating the plasma activity to limit a rate of formation of the oxide film by regulating at least one of the following: reaction kinetics, growth initiation, and surface energy; and

forming a silicon nitride layer overlying the oxide film.

104. (Previously Presented) The process of claim 103, wherein the step of forming a silicon nitride layer comprises plasma deposition of silicon nitride.

105. (Previously Presented) The process of claim 103, wherein the step of forming a silicon nitride layer comprises chemical vapor deposition of silicon nitride.

106. (Previously Presented) The process of claim 103, further comprising subjecting the oxidizable surface to a plasma containing a nitrogen species prior to exposing the oxidizable surface to a plasma comprising oxygen.

107. (Previously Presented) The process of claim 106, wherein subjecting the oxidizable surface to a plasma containing a nitrogen species comprises subjecting the oxidizable surface to a plasma formed by a gas selected from the group consisting of nitrogen, nitrous oxide and ammonia.

108. (Previously Presented) A process for fabricating a dielectric film in a semiconductor device comprising the steps of:

exposing an oxidizable surface to a plasma comprising an oxygen species, wherein the plasma has an activity relative to the oxidizable surface;

forming an oxide film having an upper surface on the oxidizable surface;

regulating the plasma activity to limit a rate of formation of the oxide film by regulating at least one of the following: reaction kinetics, growth initiation, and surface energy; and

forming an oxynitride region at the upper surface of the oxide film.

109. (Previously Presented) The process of claim 108, wherein the step of forming an oxynitride region comprises subjecting the oxide film to a plasma containing a nitrogen species.

110. (Previously Presented) The process of claim 109, wherein subjecting the oxide film to a plasma containing a nitrogen species comprises subjecting the oxide film to a plasma formed by a gas selected from the group consisting of nitrogen, nitrous oxide and ammonia.

111. (Previously Presented) The process of claim 108, further comprising subjecting the oxidizable surface to a plasma containing a nitrogen species prior to exposing the oxidizable surface to a plasma comprising oxygen.

112. (Previously Presented) The process of claim 111, wherein subjecting the oxidizable surface to a plasma containing a nitrogen species comprises subjecting the oxidizable surface to a plasma formed by a gas selected from the group consisting of nitrogen, nitrous oxide and ammonia.

113. (Previously Presented) A plasma oxidation process comprising:

exposing an oxidizable surface to an oxidizing plasma,

wherein the oxidizing plasma has an activity relative to the oxidizable surface;

forming an oxide film on the oxidizable surface; and

regulating the oxidizing plasma activity to limit a rate of formation of the oxide film to a predetermined growth rate while the oxidizable surface is being exposed to the oxidizing plasma.

114. (Previously Presented) The plasma oxidation process of claim 113, wherein regulating the oxidizing plasma activity comprises bombarding the oxidizable surface with energized ions prior to exposing the oxidizable surface to the oxidizing plasma.

115. (Previously Presented) The plasma oxidation process of claim 114, wherein bombarding the oxidizable surface comprises bombarding the oxidizable surface to remove contaminants from the oxidizable surface.

116. (Previously Presented) The plasma oxidation process of claim 114, wherein bombarding the oxidizable surface comprises bombarding the oxidizable surface to remove other oxide layers present on the oxidizable surface.

117. (Previously Presented) The plasma oxidation process of claim 114, wherein bombarding the oxidizable surface comprises bombarding the oxidizable surface to facet the oxidizable surface.

118. (Previously Presented) The plasma oxidation process of claim 114, wherein bombarding the oxidizable surface with energized ions comprises subjecting the oxidizable surface to a bias voltage.

119. (Previously Presented) The plasma oxidation process of claim 113, wherein regulating the oxidizing plasma activity comprises diluting the oxidizing plasma with an inert gas.

120. (Previously Presented) The plasma oxidation process of claim 113 further comprising providing a substrate having a back surface opposite a face surface, wherein the oxidizable surface comprises at least a portion of the face surface, and wherein regulating the oxidizing plasma activity comprises contacting the back surface with a cooling medium.

121. (Previously Presented) The plasma oxidation process of claim 113, wherein regulating the oxidizing plasma activity comprises applying an RF bias voltage to the oxidizable surface.

122. (Previously Presented) The plasma oxidation process of claim 113 further comprising:

providing a plasma chamber;

placing a substrate in the plasma chamber; and

igniting the oxidizing plasma after placing the substrate in the plasma chamber.

123. (Previously Presented) The plasma oxidation process of claim 113 further comprising igniting an inert gas plasma prior to igniting the oxidizing plasma.

124. (Previously Presented) The plasma oxidation process of claim 123 further comprising placing the oxidizable surface in the inert gas plasma.

125. (Previously Presented) The plasma oxidation process of claim 113 further comprising providing a plasma power source having an output power, and wherein regulating the oxidizing plasma comprises limiting the output power to a predetermined level.

126. (Previously Presented) The plasma oxidation process of claim 113, wherein the oxidizable surface comprises silicon.

127. (Previously Presented) The plasma oxidation process of claim 113, wherein the oxidizable surface comprises a semiconductor element of an antifuse device.

128. (Previously Presented) The plasma oxidation process of claim 113, wherein exposing an oxidizable surface to an oxidizing plasma comprises exposing the oxidizable surface to a plasma comprising oxygen.

129. (Previously Presented) The plasma oxidation process of claim 113, wherein regulating the oxidizing plasma activity comprises applying a bias voltage and sputtering a portion of the oxide film while simultaneously forming the oxide film.

130. (Previously Presented) A process for fabricating an oxide film in a semiconductor device comprising the steps of:

forming a semiconductor layer;

exposing the semiconductor layer to a plasma comprising oxygen,

wherein the plasma has an activity relative to the semiconductor layer;

forming an oxide film on the semiconductor layer; and

regulating the plasma activity to limit a rate of formation of the oxide film to a predetermined growth rate while the semiconductor layer is being exposed to the plasma.

131. (Previously Presented) The process of claim 130, wherein the step of forming a semiconductor layer comprises forming a doped semiconductor layer.

132. (Previously Presented) The process of claim 130, wherein the step of forming a semiconductor layer comprises forming a silicon layer.

133. (Previously Presented) The process of claim 130, wherein the step of forming a semiconductor layer comprises forming a germanium layer.

134. (Previously Presented) The process of claim 130 further comprising forming an electrically conductive layer prior to forming the semiconductor layer.

135. (Previously Presented) The process of claim 130, wherein the oxide film comprises a gate oxide layer.

136. (Previously Presented) The process of claim 130, wherein the oxide film comprises a passivation layer.

137. (Previously Presented) A process for fabricating a dielectric film in a semiconductor device comprising the steps of:

exposing an oxidizable surface to a plasma comprising an oxygen species and a nitrogen species,

wherein the plasma has an activity relative to the oxidizable surface;

forming an oxynitride film on the oxidizable surface; and

regulating the plasma activity to limit a rate of formation of the oxynitride film to a predetermined growth rate while the oxidizable surface is being exposed to the plasma.

138. (Previously Presented) The process of claim 137, wherein the nitrogen species comprises a compound selected from the group consisting of nitrogen, ammonia and nitrous oxide.

139. (Previously Presented) The process of claim 137, wherein the step of forming an oxynitride film comprises a gate oxide layer.

140. (Previously Presented) The process of claim 137, wherein the step of forming an oxynitride film comprises a passivation layer.

141. (Previously Presented) The process of claim 137, wherein the step of forming an oxynitride film comprises an antifuse layer.

142. (Previously Presented) The process of claim 137, further comprising subjecting the oxidizable surface to a plasma containing a nitrogen species prior to exposing the oxidizable surface to a plasma comprising an oxygen species and a nitrogen species.

143. (Previously Presented) The process of claim 142, wherein subjecting the oxidizable surface to a plasma containing a nitrogen species comprises subjecting the oxidizable surface to a plasma formed by a gas selected from the group consisting of nitrogen, nitrous oxide and ammonia.

144. (Previously Presented) A process for fabricating an oxide film in a semiconductor device comprising the steps of:

exposing an oxidizable surface to a plasma comprising oxygen,

wherein the plasma has an activity relative to the oxidizable surface;

forming an oxide film on the oxidizable surface;

regulating the plasma activity to limit a rate of formation of the oxide film to a predetermined growth rate while the oxidizable surface is being exposed to the plasma; and

forming a silicon nitride layer overlying the oxide film.

145. (Previously Presented) The process of claim 144, wherein the step of forming a silicon nitride layer comprises plasma deposition of silicon nitride.

146. (Previously Presented) The process of claim 144, wherein the step of forming a silicon nitride layer comprises chemical vapor deposition of silicon nitride.

147. (Previously Presented) The process of claim 144, further comprising subjecting the oxidizable surface to a plasma containing a nitrogen species prior to exposing the oxidizable surface to a plasma comprising oxygen.

148. (Previously Presented) The process of claim 147, wherein subjecting the oxidizable surface to a plasma containing a nitrogen species comprises subjecting the oxidizable surface to a plasma formed by a gas selected from the group consisting of nitrogen, nitrous oxide and ammonia.

149. (Previously Presented) A process for fabricating a dielectric film in a semiconductor device comprising the steps of:

exposing an oxidizable surface to a plasma comprising an oxygen species,

wherein the plasma has an activity relative to the oxidizable surface;

forming an oxide film having an upper surface on the oxidizable surface;

regulating the plasma activity to limit a rate of formation of the oxide film to a predetermined growth rate while the oxidizable surface is being exposed to the plasma; and

forming an oxynitride region at the upper surface of the oxide film.

150. (Previously Presented) The process of claim 149, wherein the step of forming an oxynitride region comprises subjecting the oxide film to a plasma containing a nitrogen species.

151. (Previously Presented) The process of claim 150, wherein subjecting the oxide film to a plasma containing a nitrogen species comprises subjecting the oxide film to a plasma formed by a gas selected from the group consisting of nitrogen, nitrous oxide and ammonia.

152. (Previously Presented) The process of claim 149, further comprising subjecting the oxidizable surface to a plasma containing a nitrogen species prior to exposing the oxidizable surface to a plasma comprising oxygen.

153. (Previously Presented) The process of claim 152, wherein subjecting the oxidizable surface to a plasma containing a nitrogen species comprises subjecting the

oxidizable surface to a plasma formed by a gas selected from the group consisting of nitrogen, nitrous oxide and ammonia.